Have Eddy-Flux Measurements Improved Over 30 Years. (A03-norman092904-Oral)

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Abstract:

Micrometeorological measurements of surface fluxes have been made by the eddy-covariance method for over 30 years. George Thurtell was one of the first persons to make such measurements in the U.S. in the mid 1960's. Great advancements have been made in instrumentation since the early days when a thousand-pound computer, 10 kW of power and a 22-foot trailer were required. Today, reliable turn-key systems are available for long-term measurements of heat, water vapor and carbon dioxide fluxes at modest cost. Numerous advancements have been made in refining and correcting minor errors in the measurements. However, our basic understanding of how these measurements relate to turbulent processes at various scales in the surface layer and planetary-boundary layer seems to have lagged behind instrumentation advances and remains little changed from 30 years ago. Even coordinate rotations commonly used today were originally derived and published by George Thurtell, and uncertainties noted then remain today. Wider acceptance of the systematic underestimation of surface fluxes by eddy covariance has drawn more attention to its shortcomings, but little progress in addressing these issues is apparent.

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